Study of large scale ionosphere-thermosphere phenomena in low latitudes using 630nm airglow imaging technique

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In this present study, we investigate the large scale ionosphere-thermosphere phenomena such as equatorial ionization anomaly (EIA) and midnight temperature maximum (MTM) using the OI 630 nm airglow imaging technique. The images are obtained from Gadanki (13.5^{O} N; 79.2^{O} E; dip 6.5^{O} N), a low latitude Indian site. The NARL all sky airglow imager is operational since March 2012; we utilize the OI 630 nm airglow imager data from April 2013 to January 2017 during moonless cloudless nights without plasma bubbles. In day time, the fountain effect due to eastward electric field creates the EIA which is often intensified during the pre-reversal enhancement period. After the sunset, the electric field turns westward and reverse fountain effect is set up in which the EIA crests approach the dip equator. This equatorward movement of the EIA crest can be identified with OI 630 nm observations from suitable low latitude locations. Herein, we study the extent and variabilities in the equatorward movement of northern EIA crest over the Indian region based on large scale intensity movements observed in OI 630 nm images during pre-midnight hours. In addition to this, there are some nights in which OI 630 nm airglow intensity increases around the midnight hours. We interpreted it as the signature of MTM that occurs due to the thermospheric pressure bulge over the equatorial region. Their occurrence characteristics and the extent to which the brightening is seen is also discussed.